



February 9, 2006

Reply to Attn of:

495

TO: Jet Propulsion Laboratory  
Attn: 301-330/New Millennium Program Manager

FROM: 100/Director

SUBJECT: Mission Readiness Review (MRR) for Space Technology 5 (ST5)

The MRR for the ST5 mission was conducted on January 27, 2006, at the Goddard Space Flight Center. The technology validation and science demonstration objectives, status of the spacecraft, ground system, Pegasus Support Structure deployment system and launch vehicle were reviewed and their readiness for launch assessed by the Goddard Program Management Council chaired by the Deputy Center Director. As part of the review, the Independent Integrated Review Team's (IIRT's) and the Launch Vehicle Red Team's evaluations were presented.

A rigorous program of internal and external reviews was used to assess the readiness of the ST5 mission for launch. The IIRT technical review process has been followed, beginning with the Spacecraft Preliminary Design Review in June 2001. As of the MRR date, all Requests for Action from prior reviews are closed.

Failure Modes and Effect Analysis (FMEA's) were performed on the spacecraft and components. A Probabilistic Risk Assessment was performed for the mission; a high probability of success was determined.

During processing of the spacecraft and Pegasus Support Structure at the launch site, four items were identified as potential constraints upon launch:

- One of three ST5 pin pullers failed open following a successful firing
- One of three pin pullers prematurely actuated on January 12
- Harness pins not locked in Deutsch Block connectors
- Final mission analysis model indicated too-close approach of ST5 spacecraft, and different constellation ordering than previous predicts

The status of each of these issues was presented at the MRR. Since the review, the open items relating to testing the deployment hardware and orbit insertion analysis listed above have been completed.

The IIRT concluded that the ST5 mission is low risk and ready to proceed to launch, pending final launch preparations and successful closure of modifications analysis and testing ongoing with the ST5 deployment system. IIRT Residual Risk charts are enclosed.

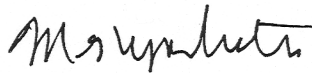
Residual risks were presented by both the project and the IIRT at the MRR. All technical risks have been mitigated to a low or very low level of risk.

One action item was recorded at the MRR: Provide the number of failure-free hours after the last change (Component/System Run Time). The action item and response to this are enclosed.

There are currently no outstanding liens against launch.

ST5 is scheduled to be launched on February 28, 2006, from Vandenberg Air Force Base (the Western Range) during an eighty-two minute launch window that opens at 8:57 AM EST. The launch vehicle is a Pegasus XL launching from an L-1011 aircraft.

In conclusion, ST5 is a low risk mission ready for launch assuming successful completion of launch preparations, and I recommend authorizing the mission to proceed.

  
for Edward J. Weiler

2 Enclosures

cc:

100/Mr. Ryschkewitsch

400/Mr. Greaves

400/Mr. Morrow

400/Mr. Obenschain

495/Mr. Azarbarzin

## ST5 Residual Risks presented by IIRT at MRR



### ST-5 5X5 Residual Risks



		Consequence				
		1	2	3	4	5
Probability	5					Very High
	4					High
	3					Moderate
	2	144				Low
	1		134	111 39 137 151		129 Very Low
		Minor Impact (Full Success)	Loss of Non-Critical Function (Full Success)	Degraded Mission (Minimum Success)	Does Not Meet Minimum Success	Loss of Mission

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#### Risk 129

Potential for spacecraft not to deploy; not to meet spin rate requirements; collide with launch vehicle or each other.

#### Risk 137

Use of old FPGA's and programming algorithm: Potential for on-orbit failure of magnetometer, transponder, C&DH

#### Risk 111

Use of commercial-grade capacitor in the Variable Emittance Coating board with no long-term reliability/stability information for these devices.

#### Risk 39

Spacecraft are powered off during ascent. Spacecraft could fail to turn on.

#### Risk 144

Potential for both redundant diodes on solar cells to fail due to workmanship.

Enclosure 1

Risk 151

NASA advisory identified concern with failures of EEPROM Hitachi Die on C&DH.

Risk 134

C&DH command problem at extreme cold temperatures: Some command errors at cold temperatures on s/c #1 and #2. Thermal predicts show spacecraft won't reach these extreme temperatures on-orbit

Goddard Program Management Council  
ST-5 Mission Readiness Review (MRR) – January 27, 2006

**ACTIONS**

	Program / Project	Actionee	Action	Status	Date Due/ Date Closed
1.	ST-5	Azarbarzin /495	[...] provide the number of failure-free hours after the last change (Component/System Run Time).	Open:	February QSR

**Response**

ST5 Error Free Operational hours as of transfer of payload to Building 1555 at Vandenberg AFB

	Last hardware change impacting spacecraft performance	Failure free hours since hardware change	Failure free hours since FSW 99.4 installation **	Total hours of I&T testing ***
Spacecraft S	None *	1138 (980 of which are post EDAC error)	248	1182 includes 202 hrs before EDAC error
Spacecraft T	Transponder Rework	900	258	1019 includes 119 hrs before rework
Spacecraft V	VEC Harness rework	861	263	1013 includes 152 hrs before rework

\* = No hardware changes performed after integration completed.  
A single non-recurring EDAC error occurred on Spacecraft #1 (S) in T/V

\*\* = Hours included in failure free hours since hardware rework

\*\*\* 202 hrs = 44hrs post final S/C S assembly/integration and 158 test hrs

Enclosure 2